

EXHIBIT E

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16 UNITED STATES DISTRICT COURT
17 NORTHERN DISTRICT OF CALIFORNIA
18 SAN FRANCISCO DIVISION

19 GOOGLE LLC,
20 Plaintiff and Counter-defendant,
21 v.
22 SONOS, INC.,
23 Defendant and Counter-claimant.

Case No. 3:20-cv-06754-WHA
Related to Case No. 3:21-cv-07559-WHA

**OPENING EXPERT REPORT OF
DOUGLAS C. SCHMIDT**

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1 Dep. Tr., 122:2-124:4.

2 **4. Receiver Playing Back Retrieved Media**

3 162. After receiving the setPlaylist message, the Receiver functions to retrieve and
 4 playback a media item (e.g., the media item corresponding to the videoId in the setPlaylist
 5 message). *See, e.g., Mo Dep. Tr., 142:6-22; GOOG-SONOSWDTX-00037243 [MDX*
 6 *Communication Protocol v3], 51-52 (“Server to Screen” setPlaylist message containing “videoId”*
 7 *for “[v]ideo that should start playback ASAP.”), 58-59 (“Remote to Server” “setPlaylist” message*
 8 *containing “videoId” for “[v]ideo that should start playback ASAP.”); GOOG-SONOSWDTX-*
 9 *00041491 [YouTube Orbit (MDx) Android - MDx Playback on Android], 95:*

10 Eventually CloudSession.doLaunchApp (MdxPlaybackDescriptor initialPlayback)
 11 gets called with the MdxPlaybackDescriptor. This will set the information of
 12 MdxPlaybackDescriptor into ‘setPlaylist’ params outlined here and send this with
 13 the connection properties when connecting. In response, the server will initialize the
 14 RQ playlist with the given playback information and ***tell the TV to start playing the***
 15 ***video.***

16 163. In this regard, the Receiver uses a given videoId (e.g., from the setPlaylist message)
 17 to retrieve a corresponding media item from the given YouTube service. In particular, the Receiver
 18 makes a “getPlayer” call with the videoId to the “Player Service” in the YouTube cloud
 19 infrastructure and receives a response containing one or more URLs for the media item. *See, e.g.,*
 20 *Mo. Dep. Tr., 137:17-25, 138:13-23 (“At a higher level, the receiver, when it has a video ID, what*
 21 *happens ... for playback typically contains a get player requests [sic]. That’s a network request.*
 22 *And then that response contains information that is needed.”), 139:13-140:1 (Q: “Is the get player*
 23 *request targeted to a service that is external of the receiver device?” A: “It hits the player service,*
 24 *which is a back end.”), 141:8-15, 142:6-144:15 (“From my perspective, ... I guess the receiver or*
 25 *client gets a video ID and ... what happens after that is a get player request is made and then the*
 26 *response ... it may contain, you know, URLs related to where the content may be.”), 146:1-7;*
 27 *Nicholson Dep. Tr., 93:23-94:11, 113:15-115:17, 124:24-125:11; see also, e.g., GOOG-*
 28 *SONOSWDTX-00039491 [YouTube Orbit (MDx) - Credential Transfer Tokens (CTTs)], 91*
(illustrating Receiver making “GetPlayer” request with videoId to “Player Service”); GOOG-
SONOSWDTX-00039785 [Server], 85-86 (describing and illustrating process by which “RPC to
GetPlayer for available streams URLs” is made), 89; GOOG-SONOSWDTX-00052121 [YouTube

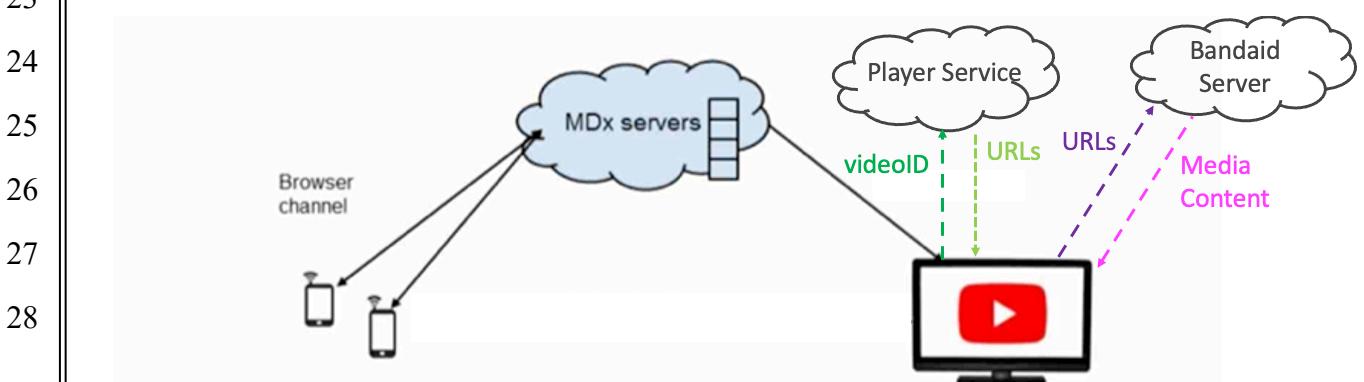
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1 Developer's Handbook – Life of a video watch], 23-26; GOOG-SONOSNDCA-00115814 [Edge
 2 Streaming and Bandaid CDN], 15, 20.

3 164. The Receiver then uses the one or more URLs to retrieve the media item from one
 4 or more “Bandaid” servers in the YouTube cloud infrastructure for the given YouTube service and
 5 then render the retrieved media item at the point within the media where the Sender was rendering
 6 when it detected the selection of the Cast button/icon and the selection of the Receiver from the
 7 Device Picker menu. *See, e.g.*, Mo Dep. Tr., 142:6-144:15 (“YouTube playback relies on what we
 8 call band-aid servers.... [T]hey are kind of like a cache system for storing ... video bits for
 9 playback. As far as I understand, player responds and obtains information that the player needs to
 10 know ... where these servers or caches are to load from.”), 144:19-145:6, 145:12-25; Nicholson
 11 Dep. Tr., 65:16-67:11, 113:15-115:17, 124:24-125:11; *see also*, *e.g.*, GOOG-SONOSWDTX-
 12 00052121 [YouTube Developer’s Handbook – Life of a video watch], 23-26; GOOG-
 13 SONOSWDTX-00039785 [Server], 85-86 (describing and illustrating process by which “RPC to
 14 bandaid for audio or video content” is made).

15 165. Notably, the aforementioned process by which a Receiver plays back media content
 16 occurs whenever the Receiver is to playback a media item, such as after finishing playback of the
 17 initial media item for the Cast session, after a user skips forward to a next media item, etc. *See,*
 18 *e.g.*, Mo Dep. Tr., 169:6-19, 175:1-23. For instance, after playing back the initial media item, the
 19 Receiver performs the aforementioned process using a videoId for the next media item contained
 20 in a received WatchNextResponse from the WatchNext service in the YouTube cloud
 21 infrastructure.

22 166. The process by which a Receiver plays back a media item corresponding to a videoId
 23



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1 is shown below in a demonstrative that builds on Google's MDx architecture diagram:
2
3 GOOG-SONOSWDTX-00037264 [Orbit & Cassini Deep Dive], 69 (modifications added); *see*
4 *also, e.g.*, GOOG-SONOSWDTX-00050334 [Playback params passing in Audio Tier], 40-41 (“10.
5 Client app [on Receiver] calls InnerTube getPlayer with the video ID and playlist ID.... 19.
6 getPlayer returns the streamingUrl ... to the client.... 20. YTM app [on Receiver] calls
7 GetWatchNext with video ID and playlist ID.... 25. GetWatchNext returns the next track in the
8 response.”).

5. YouTube Sender in Casting Mode of Operation

10 167. After detecting the selection of the Cast button/icon and the selection of a particular
11 Receiver (or set of Receivers) from the Device Picker menu, the Sender functions to detect an
12 indication that playback responsibility has successfully transferred from itself to the selected
13 Receiver (or Receivers), after which the Sender switches to operate in the Casting mode. *See, e.g.*,
14 GOOG-SONOSWDTX-00041491 [YouTube Orbit (MDx) Android - MDx Playback on Android],
15 95 (describing YouTube Sender transitioning its “Player stack” from a “local” mode to an “MDx
16 or ‘remote’ mode” after detecting “MdxSessionStatusEvent”).

17 168. The Sender detecting this indication and transitioning from the non-Casting mode
18 to the Casting mode in which the Receiver (instead of the Sender) is configured for playback of the
19 Watch Next queue is evident from changes to the user-facing appearance and functionality of the
20 Sender. For instance, the appearance of the Cast icon displayed by the Sender is changed to indicate
21 that the Sender is now connected to a Receiver, thereby informing the user that a Receiver is now
22 responsible for playback as opposed to the Sender. *See, e.g.*, SONOS-SVG2-00060294 [Play media
23 from Chromecast-enabled apps to your speaker or display], 94 (“When you’re connected, the Cast
24 button will turn from light to dark grey, letting you know that you’re connected.”); GOOG-
25 SONOSNDCA-00061126 [Cast audio from Chromecast-enabled apps to speakers] (“The Cast
26 button will change colors, letting you know you’re connected.”); SONOS-SVG2-00060340 [Watch
27 YouTube Kids videos on your TV] (“Once connected, you can start watching [on your Chromecast,
28 game console, or smart TV] when the Cast icon turns blue”); GOOG-SONOSWDTX-00038270,